

its wishes and inducing the nurse to comply with them cannot be definitely looked at as a case of self-consciousness, but only of consciousness. This is one of the most intricate questions to decide—when the child distinguishes its own body, head, hands, &c., from other objects, as belonging to himself. The first time a child says “I” and “me,” in the correct sense, it may be considered to have passed the limit. The formation of ideas by associating impressions, as well as the formation of general ideas (*Begriffe*) by uniting similar qualities of different objects, is intellectual work done by the child long before it knows anything of its own individuality. It seems to me that self-consciousness does not arise suddenly, but by degrees, after many experiments have shown the difference between touching his own body and external objects with his little hand.

I have been occupied with psychogenetical problems since nearly four years, continually collecting facts. Should you be able to awaken some interest for these most important investigations (I mean the physiology and psychology of infants), I think the trouble taken would soon be repaid by the results.

I am, sincerely,

DR. WM. PREYER, Professor

P.S.—Perhaps the observations and experiments on the senses (sight, hearing, smell, taste) of new-born animals and infants which I published in *Kosmos* (Zeitschrift herausgegeben von E. Krause), vol. iii. pp. 22–37, 128–132 (1878, Leipzig), may have some little interest. In England Romanes has written very able papers on the development of instinct and intelligence. His address is 18, Cornwall Terrace, Regent's Park, London.

Yours, &c.,

W. P.

#### ABNORMAL BAROMETRIC GRADIENT BETWEEN LONDON AND ST. PETERSBURG IN THE SUN-SPOT CYCLE

BEFORE alluding to the subject which forms the heading of the present communication, I must apologise for having allowed some rather serious errors to creep into the figures given for the barometric abnormals of London in my letter to NATURE, vol. xxiii. p. 243. The errors were caused by a friendly computer taking the differences from the mean for each year incorrectly in one or two cases.

I am glad to say however with respect to the relation between the barometric abnormals as there given and the sun-spot numbers, that far from its being vitiated by the corrections which have now been made, they on the contrary considerably strengthen it, as is evident when the following corrected values for the mean cycles are compared with those given in my former letter:—

##### LONDON

##### Annual Barometric Abnormals, Mean Cycles

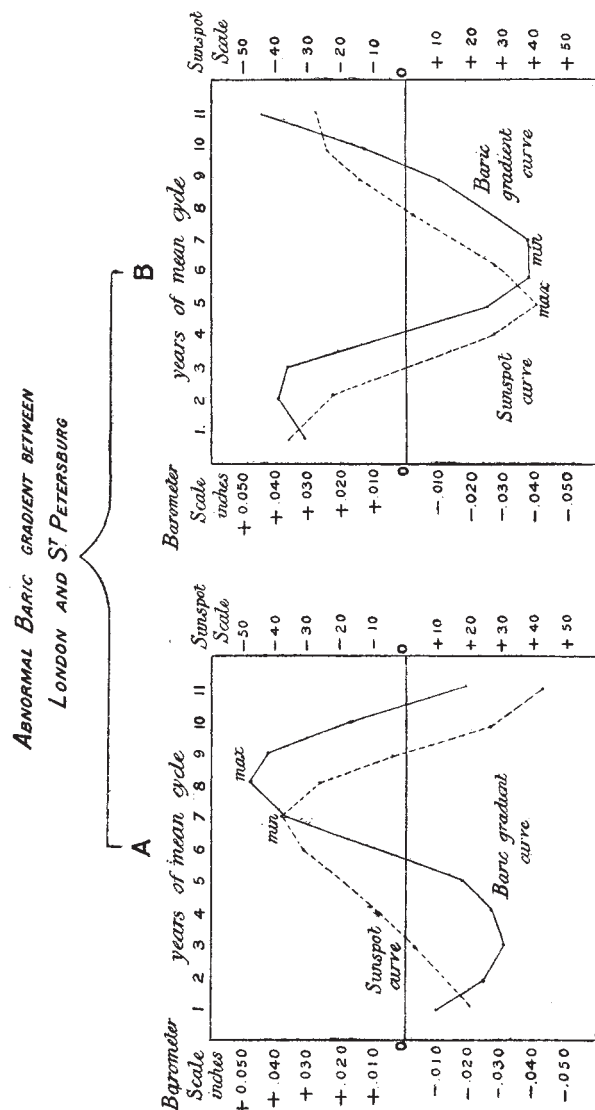
Maximum years in fifth line.		Minimum years in seventh line	
Pressure	Sun-spots	Pressure	Sun-spots
(1811–77).	(1811–77).	(1816–79).	(1816–79).
1. +0'011 ...	-33'9 ...	-0'006 ...	+23'3
2. +0'024 ...	-23'4 ...	-0'003 ...	+14'5
3. +0'017 ...	0'0 ...	-0'002 ...	+4'8
4. -0'003 ...	+28'2 ...	-0'004 ...	-5'6
5. -0'011 ...	+43'1 ...	-0'006 ...	-19'0
6. -0'012 ...	+34'2 ...	-0'002 ...	-32'5
7. -0'008 ...	+16'8 ...	+0'003 ...	-37'1
8. ±0'000 ...	+0'2 ...	+0'020 ...	-25'4
9. +0'002 ...	-14'2 ...	+0'025 ...	+1'8
10. +0'010 ...	-24'2 ...	+0'010 ...	+30'9
11. +0'008 ...	-26'3 ...	-0'009 ...	+44'8

If now we take these corrected figures, and subtract from them those given in NATURE, vol. xx. p. 28, for St. Petersburg (reduced to inches), which comprise very nearly the same period, we get for the abnormal annual baric gradient from London to St. Petersburg in each year of the mean cycle, the following figures:—

#### Abnormal Annual Barometric Gradient between London and St. Petersburg

(B) Maximum years in fifth line.		(A) Minimum years in seventh line.	
Pressure.	Sun-spots	Pressure.	Sun-spots
London-St. Petersburg (1811–77).	(1811–77).	London-St. Petersburg (1816–79).	(1816–79).
inches.		inches.	
1. +0'032 ...	-33'9 ...	-0'012 ...	+23'3
2. +0'038 ...	-23'4 ...	-0'027 ...	+14'5
3. +0'036 ...	0'0 ...	-0'033 ...	+4'8
4. +0'007 ...	+28'2 ...	-0'029 ...	-5'6
5. -0'029 ...	+43'1 ...	-0'018 ...	-19'0
6. -0'040 ...	+34'2 ...	+0'010 ...	-32'5
7. -0'040 ...	+16'8 ...	+0'036 ...	-37'1
8. -0'025 ...	+0'2 ...	+0'048 ...	-25'4
9. -0'012 ...	-14'2 ...	+0'041 ...	+1'8
10. +0'013 ...	-24'2 ...	+0'016 ...	+30'9
11. +0'043 ...	-26'3 ...	-0'018 ...	+44'8

An inspection of these figures at once reveals the existence of a



baric gradient oscillation of single period, closely following the inverse sun-spot oscillation.

In order to exhibit the constancy of the lag in the occurrence of the gradient variations behind those of the sun-spots, as well as the remarkable similarity in form of the two oscillations, I have reproduced the above figures graphically in the accompanying diagram, in which the baric gradient abnormalities are plotted out simultaneously with the *inverted* sun-spot abnormalities:—

It will be observed that there is an almost uniform lag in the baric gradient curve behind the inverted sun-spot curve of a little more than a year, while a variation of '01 inches on the barometer scale corresponds very nearly throughout (allowance being made for the lag) to 10 on the sun-spot scale.

As the strength of the prevailing west and south-west winds of these regions must necessarily depend on the amount of the baric gradient between places on the edge of the European continent like London, and those inland, and to the north as St. Petersburg, there is fair ground for concluding that the west and south-west winds must on the whole be stronger in years of minimum sun-spot than in those of maximum sun-spot.

Some direct evidence in favour of this notion has already been communicated to NATURE by Mr. S. A. Hill and Mr. Ellis of the Greenwich Observatory.

Moreover the amount of variation in the strength of the wind between London and St. Petersburg, following upon the change in the barometric gradient between the two during the cycle, should be enough to cause a *sensible* variation in the character of the weather; for according to Mr. Blanford the mean barometric gradient over the Bay of Bengal during the south-west monsoon is about 0'025 inches in 100 miles.

Now as the distance from London to St. Petersburg is about 1300 miles; in order to maintain a current of air between them throughout the year equal to that of the summer monsoon in the Bay of Bengal, there would have to be a total annual barometric gradient of 0'0325 inches. As the range of the abnormal gradient in the present case amounts to 0'08 inches it should cause a variation in the wind equal to one-fourth that of the monsoon.

For the period 1822-71 the normal mean annual gradient from London to St. Petersburg is + 0'098 inches. The variation of the abnormal is therefore nearly equal to the normal gradient.

Taking the results just obtained with those given by Mr. H. F. Blanford in his article in NATURE, vol. xxi. p. 477, it may be concluded that there is a barometric "see-saw" between Russia and Western Siberia and the Atlantic coasts of Europe, similar to that between the former districts and Indo-Malaysia.

Just as in the latter case the relation will probably be found to be more marked in the winter months, and may also be found to explain some of the numerous facts already ascertained regarding variations in the rainfall, cloud, and temperature of Western Europe, at different epochs of the sun-spot cycle.

E. DOUGLAS ARCHIBALD

#### CONGRESS OF THE FRENCH LEARNED SOCIETIES

THE session of the Congress of the French Learned Societies has lasted only three days, but has exhibited an unusual amount of interest. Many papers were read in the section of Science presided over by M. Milne-Edwards, the veteran member of the Institute.

M. Alluard summarised the results of rotation of the wind as registered by anemometers at an altitude where it is not to be feared that surface-friction should interfere. The number of rotations from north to south was 113. Of these 83 were in the positive direction, or by east, and only 30 by west; 49 of the 83 positive were continued to the west, and 34 stopped at the south or vicinity; consequently when a wind has come from north to south by east, the greater probability is that it will continue rotating to the west. When it has rotated to the west the probability is even greater that it will continue to the north. Again, of the 49 three-quarter rotations observed not less than 32 were completed, and only 17 stopped at the west and vicinity. The same thing cannot be said of the negative rotations: only 13 were from north to east, and of these only 6 were from north to north by west. These results are a confirmation of Dove's well known law.

General Nansouty, the director of the Pic-du-Midi Observatory, announced that the new buildings on the top of the mountain will soon be ready, and that next winter he will use them for taking readings. It is curious that the last winter has been one of unusual mildness in this exalted altitude.

M. Hébert read a long paper on the formation of cyclones, which he explains by the influence of mountain ranges on the great atmospheric currents loaded with humidity.

M. Vidal presented a photometer based on the action of light on a selenium element of the ordinary construction. M. Vinot, editor of *Le Ciel*, presented a refractor mounted equatorially, of which the price is less than 10*l.*, with a magnifying power of 150. M. Joubert gave details on the working of the Trocadéro Popular Observatory, which is now in constant operation, and where lectures on astronomical subjects are delivered regularly.

M. Guillemare read a paper on the use of soleine for lighting purposes. This product has been obtained by the distillation of a number of resinous matters, which have a point of ebullition from 150 to 160 Centigrade and a mean density of 0'860. When they have been freed from every other matter they can be used in a specially-prepared burner. This soleine can be prepared in immense quantities in all countries where pines are abundant.

A number of interesting communications were made on palæontology and zoology, generally advocating Darwinian views.

The final sitting was presided over, as usual, by the Minister of Public Instruction, and took place in the large hall of the Sorbonne. A number of crosses of honour and medals were distributed.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—The lectures of the summer term commence this week. At the University Museum Prof. Clifton will conduct a class in practical physics and will lecture informally on the use of optical instruments. Mr. Stocker will give an experimental lecture in mechanics, and Mr. V. Jones will lecture on mechanical problems, in continuation of their courses last term. Prof. Odling will continue his course of lectures on organic chemistry, and Mr. Fisher will finish his inorganic course.

At Christ Church Mr. Harcourt lectures on the metals, and Mr. Baynes on the theory of gases. At Balliol Mr. Dixon gives an experimental lecture in elementary physics.

In a Congregation holden on Tuesday, April 27, it was resolved that candidates, not being members of the University, may present themselves at any of the ordinary examinations for Responsions. Last term a statute was passed instituting an examination to take place in the Long Vacation. This examination, which can be passed by candidates before matriculation into the University, is to be passed in lieu of Responsions. The effect of the statute will be that all young men may pass Responsions before they matriculate, and less of their University time will be consumed in getting up school work.

The proposal to designate the unattached students as students of the University Hall was lost by a large majority, 90 voting against the proposal and only 9 for it.

#### SOCIETIES AND ACADEMIES

##### LONDON

Chemical Society, April 21.—Dr. Debus in the chair.—It was announced that a ballot for the election of Fellows would take place at the next meeting, May 5.—The following papers were read:—On the distillation of mixtures of carbon disulphide and carbon tetrachloride, by F. D. Brown. The objects of the research were to find the boiling-point of every possible mixture of the two liquids, and the composition of the vapour evolved by any mixture when boiling. Tables and curves giving these results accompany the paper. The author also finds that the composition of the vapour evolved is independent of the pressure under which ebullition takes place.—On the estimation of hydric peroxide by means of potassic permanganate, by W. E. Adeney.—On the oxidation of sulphurous acid, by H. P. Dixon. The author finds that when sulphur dioxide, steam, and oxygen are exposed to a temperature of 100° C. no diminution of volume takes place, and therefore no sulphuric acid is formed. If the temperature be allowed to fall so that water condenses, a slight contraction in volume is observed.—On the reduction of cinnamic alcohol, by F. Hutton and W. R. Hodgkinson. When this substance is heated to 100° C. for three or four days